# Homework 10

*Christophe Hunt*

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# 1 Page 469: problem 3

The following data were obtained for the growth of a sheep population introduced into a new environment on the island of Tasmania (adapted from J. Davidson "On the Growth of the Sheep of Tasmania" Trans. R. Soc. S. Australia.)

Table 1: My caption

| t (year) | 1814 | 1824 | 1834 | 1844 | 1854 | 1864 |
|---|---|---|---|---|---|---|
| P (t) | 125 | 275 | 830 | 1200 | 1750 | 1650 |

## 1.1 a. Make an estimate of $M$ by graphing $P(t)$.

## 1.2 b. Plot ln[P/(M-P)] against $t$. If a logistic curve seems reasonable, estimate $rM$ and $t$*.

# 2 Page 478: problem 6

Suggest other phenomena for which the model described in the text might be used

# 3 Page 481: problem 1

## 3.1 a. Using the estimate that $d_a$ = 0.054$v^2$, where 0.054 has dimensions ft*hr$^{2/Mi}$2, show that the constant $k$ in Equation (11.29) has the value 19.9 ft/secˆ2.

## 3.2 b. Using the data in Table 4.4, plot $d_b$ in ft versuse vˆ2/2 in ft$^{2/sec}$2 to estimate 1/$k$ directly.

# 4 Page 522: problem 21

Oxygen flows through on tube into a liter flasks filled with air, and the mixture of oxygen and air (considered well stirred) escapes through another tube. Assuming that air contains 21% oxygen, what percentage of oxygen will the flask contain after 5 L have passed through the intake tube?

# 5 Page 522: problem 22

If the average person breathes 20 times per minute, exhaling each time 100 inˆ3 of air containing 4% carbon dioxide. Find the percentage of carbon dioxide in the air of a 10,000 ftˆ3 closed room 1 hr after a class of 30 students enters. Assume that the air is fresh at the start, that the ventilators admit 1000 ftˆ3 of fresh air per minute, and that the fresh air contains 0.04% carbon dioxide.